

**Notice of Allowability**

Application No.

09/764,880

Examiner

Thinh T Nguyen

Applicant(s)

MATSUKI ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12/23/2004.
2. ☒ The allowed claim(s) is/are 1-3,5-13 and 15-20.
3. ☒ The drawings filed on 23 January 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

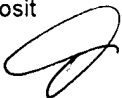
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
David Helms  
Supervisory Patent Examiner  
Technology Center 2800

## DETAILED ACTION

### Reason for allowance

1. claims 1-3,5-13,15-20 are allowed. The following is an examiner's statement of reason for allowance:

#### **I/ Group I: claims 1-3,20:**

Claims 1-3, 20 are allowed because none of the references of record teaches or suggests the claimed **SEMICONDUCTOR DEVICE STRUCTURE AND METHOD FOR MANUFACTURING THE SAME** having the limitations:

-- " a portion of said silicon contact plug extends beyond the first interlayer insulating film so that the top surface of said silicide pad is formed above the top surface of said first interlayer insulating film, said silicide pad contacting an entirety of said portion of said silicon contact plug that extends beyond the first interlayer insulating film. "--  
and all other limitations as recited in claim 1.

#### **II/ Group II: claims 5-6:**

Claims 5-6 are allowed because none of the references of record teaches or suggests the claimed **SEMICONDUCTOR DEVICE STRUCTURE AND METHOD FOR MANUFACTURING THE SAME** having the limitations:

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-- "forming a silicide pad in a self-aligning manner with the silicon plug, the silicide pad having a larger diameter than that of said silicon plug, wherein the step of forming said silicide pad includes the steps of: selectively and partially removing the insulating film and silicon at least in the vicinity of said contact plug such that the plug protrudes; --

and all other limitations as recited in claim 5.

**III/ Group III: claims 7-10:**

Claims 7-10 are allowed because none of the references of record teaches or suggests the claimed **SEMICONDUCTOR DEVICE STRUCTURE AND METHOD FOR MANUFACTURING THE SAME** having the limitations:

-- "a silicide pad formed covering said top end surface and said top side surface of said polysilicon contact plug in a self-aligning manner said polysilicon contact plug, so that said silicide pad contacts an entirety of said protrusion "--

and all other limitations as recited in claim 7.

**IV/ Group IV: claims 11-12,18:**

Claims 11-12,18 are allowed because none of the references of record teaches or suggests the claimed **SEMICONDUCTOR DEVICE STRUCTURE AND METHOD FOR MANUFACTURING THE SAME** having the limitations:

-- " a silicide pad formed on said protruding portion so that said silicide pad contacts an entirety of said protruding portion, said silicide pad being formed self-aligning manner with said polysilicon contact plug and having a diameter which is larger than the

polysilicon contact plug, a first surface of said silicide pad being above a second surface of said interlayer insulating film; “--

and all other limitations as recited in claim 11.

**V/ Group V: claims 13,15,16,19:**

Claims 13,15,16,19 are allowed because none of the references of record teaches or suggests the claimed **SEMICONDUCTOR DEVICE STRUCTURE AND METHOD FOR MANUFACTURING THE SAME** having the limitations:

-- “selectively and partially removing the first insulating film and the polysilicon layer at least in the vicinity of the polysilicon plug such that the polysilicon plug protrudes from the first interlayer insulating layer; and forming silicide pad on the polysilicon plug in a self-aligning manner with the polysilicon plug, the silicide pad having a diameter larger than a diameter of the polysilicon plug, a first surface of the silicide pad being disposed above an upper surface of the first interlayer insulating film, said silicide pad being formed by: depositing a refractory metal film over the polysilicon plug and the first interlayer insulating layer; “--

and all other limitations as recited in claim 13.

**VI/ Group VI: claim 17:**

Claim 17 is allowed because none of the references of record teaches or suggests the claimed **SEMICONDUCTOR DEVICE STRUCTURE AND METHOD FOR MANUFACTURING THE SAME** having the limitations:

-- "forming tungsten layer second interlayer insulating film and contacting the tungsten plug. wherein the step of forming said silicide pad includes the steps of: selectively and partially removing the insulating film and silicon at least in the vicinity of said contact plug such that the plug protrudes; depositing a refractory metal film; converting the refractory metal film into a refractory metal silicide by a heat treatment; and removing said refractory metal film remaining without being converted into silicide and reaction products between said refractory metal and an atmospheric gas during the heat treatment. "--

and all other limitations as recited in claim 17.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

### **Conclusion**

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thinh T Nguyen whose telephone number is 571-272-1790. The examiner can normally be reached on Monday-Friday 9:00am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached at 571-272-1787. The fax phone numbers for


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the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Thinh T Nguyen 

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David Helms  
Supervisory Patent Examiner  
Technology Center 2800